MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
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ENVIRONMENTAL RESPONSE DIVISION
INTERNET: http://www.michigan.gov/deq

INFORMATION BULLETIN #2

TITTABAWASSEE/SAGINAW RIVER FLOOD PLAIN
Environmental Assessment Initiative
Midland, Saginaw Counties
August 2002

INTRODUCTION

This is the second in a series of information bulletins to inform area communities about progress, future plans, meeting dates, and other activities regarding the Tittabawassee/Saginaw River Flood Plain Environmental Assessment Initiative. What follows is a summary presentation of the results of the Phase II Sampling Program (Phase II) for the Tittabawassee River dioxin study area conducted this past spring. Phase II was developed and implemented as part of the Department of Environmental Quality's (DEQ's) continuing efforts to identify flood plain areas where dioxin and dioxin-related compounds (hereinafter referred to collectively as dioxin) could pose public health or environmental concern.

Accompanying this information bulletin are 5 maps (1-5) that identify the dioxin environmental assessment area, Phase I and Phase II flood plain sample locations, and the Tittabawassee River sample locations that were collected as a part of the DEQ's Saginaw Bay Watershed Sediment Study, the results of which were released in June 2002. Also included with this information bulletin is a table presenting the dioxin sample results generated from Phase II.

To help clarify issues or address concerns you may have on any aspect of this environmental assessment initiative, a glossary is provided at the end of this information bulletin along with a list of information contacts for the Departments of Environmental Quality (DEQ), Community Health (DCH), and Agriculture (MDA).

BACKGROUND

Soil samples collected as part of a wetland mitigation project revealed elevated levels of dioxin in a farm field located in the Tittabawassee River flood plain near its confluence with the Saginaw River. The samples, collected during April 2000, identified concentrations of dioxin as high as 2,200 parts per trillion (ppt) total toxic equivalent (TEQ). The current soil dioxin criteria for residential direct contact (RDCC) is 90 ppt TEQ, as established under the provisions of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Guidance criteria established by the U.S. Agency for Toxic Substances and Disease Registry (ATSDR) range from 50 ppt TEQ as a screening level indicating a need for further study to 1,000 ppt TEQ as an action level.

Phase I Environmental Assessment (Data Released February 2002): Concern over the possible implications of the sample results prompted the DEQ to develop and implement a Phase I Environmental Assessment involving the collection and analysis of soil samples from various locations in the Tittabawassee River flood plain. During the period from December 2000 through June 2001, the DEQ collected soil samples from 5 locations in the Tittabawassee River flood plain between the Center Road Bridge in Saginaw Township and the Saginaw River confluence. A total of 34 soil samples were collected at depths ranging from the soil surface to 15 inches below the surface. Analytical results identified concentrations ranging from 35 to 7,300 ppt TEQ. Based on the Phase I sampling results, and the significant residential, agricultural, and recreational use occurring within the Tittabawassee River flood plain, the DEQ proceeded with preparation and implementation of a Phase II Environmental Assessment focusing on selected areas upstream of the Phase I assessment area.

PHASE II ENVIRONMENTAL ASSESSMENT

The objectives of the Phase II Environmental Assessment follow:

- Identify whether dioxin is present in concentrations of concern to the public health and the environment.
- Identify if dioxin varies in concentration between upstream and downstream locations.
- Identify distribution of dioxin with respect to soil depth.
- Compare the distribution of dioxin concentrations in flood plain and non-flood plain soil.
- Gather information about the source or sources of the observed dioxin.
- Identify the need for, and the scope of, future investigation/assessment efforts.

Soils: To accomplish these objectives, Phase II soil samples were collected from 12 locations upstream and downstream of the City of Midland (Midland).

Location	Distance from Midland	# Samples
State of Michigan Property - Sanford	8 miles upstream; Tittabawassee River	2
Chippewa Nature Center	2 miles upstream; Chippewa River	2
Chippewa Nature Center	2 miles upstream; Pine River	2
Emerson Park	City of Midland	3
Caldwell Boat Launch	1 mile downstream	2
Freeland Festival Park	7 miles downstream	3
Livestock Farm	9 miles downstream	6
Imerman Park	11½ miles downstream	14
West Michigan Park	18 miles downstream	3
Cropland	20 miles downstream	5
Former National Plate Glass	20 miles downstream	1 soil
19 Riverside Blvd.	22 miles downstream	5 soil 4 egg

Samples were primarily collected from 3 soil layers at each sample location, these being 0-3 inches, 3-6 inches and 12-15 inches. At certain locations, based on property use, a surface soil sample was also collected from 0-1 inch. In addition to dioxin and dioxin-related compounds, the soil samples were analyzed for polychlorinated biphenyl (PCB) compounds, total organic carbon, and soil grain size. A smaller number of samples underwent pesticide analysis.

Only one residential property was sampled on Riverside Boulevard due to property access concerns. The number of sample locations was reduced from those originally proposed at Emerson Park (6 to 3) and at the cropland (8 to 5) based on an on-site field assessment of site characteristics. Also, the following additional samples were collected and analyzed:

- One soil sample location from the former National Plate Glass site of environmental contamination.
- Four eggs from chickens located at the Riverside Boulevard residence.

Surface Water Run-off: Two surface water run-off samples were collected within the estimated 100-year flood plain of the Tittabawassee River from the former National Plate Glass site.

Groundwater: The Phase II Environmental Assessment also included the collection of residential groundwater well samples because some residences in the Freeland Festival Park area continue to be serviced by private groundwater wells for their drinking water. Water samples were collected from 18 residential wells that have the potential to be impacted by the Tittabawassee River flood events.

PHASE II SAMPLE DATA

The accompanying table presents all the final soil and surface water sample results in dioxin TEQ concentrations. Complete analytical results from the residential drinking water wells have not yet been received and will be reported in a final Phase II Environmental Assessment Report to be released this fall. In that report, it is the intent of the DEQ to correlate the flood plain dioxin data collected from Phase II with the Phase I results and the data collected as part of the DEQ's Saginaw Bay Watershed Sediment Study. In addition, the DEQ will be assessing whether trends and/or correlations exist between dioxin concentrations and soil grain size, total organic carbon, and ground elevation within the flood plain.

Preliminary Observations: Although the DEQ has not completed a full evaluation of the data, preliminary observations suggest the following:

- Soil sample locations within the Tittabawassee River flood plain downstream of Midland contain elevated dioxin concentrations.
- Dioxin concentrations from soil sample locations upstream of Midland were consistent with dioxin concentrations in soil samples previously collected statewide from areas

where there are no known dioxin release source(s).

- Five of the 6 soil sample locations at the livestock farm site are outside of the estimated 100-year flood plain. These 5 locations contained dioxin at concentrations consistent with statewide background concentrations. The sixth sample location, situated just within the estimated 100-year flood plain elevation, showed a tenfold increase in dioxin concentrations.
- The former National Plate Glass soil sample location contained the least dioxin. The site is located outside the estimated 100-year flood plain.
- The highest dioxin concentration is at the Freeland Festival Park (3,400 ppt TEQ) at 12-15 inches.
- The highest concentration of dioxin found in a surface soil sample (0-1 inch) is also located in Freeland Festival Park (1,500 ppt).
- Dioxin concentrations at Imerman Park are highest at sample locations nearest to the Tittabawassee River and lowest at sample locations near M-47 at the upper edge of the estimated 100-year flood plain.
- At all sample locations, the concentration of PCB compounds present in the soil samples represent an insignificant contribution to the dioxin TEQ.
- Eggs from chickens that free range on flood plain soil exhibit elevated concentrations of dioxin. The food products from other animals raised on the flood plain may also be affected.
- Analysis is not yet complete for the drinking water well samples.

PUBLIC HEALTH & SAFETY

The DEQ, DCH, and MDA have worked together to develop guidance documents intended to assist persons in determining the appropriate precautions they should take in response to the presence of dioxin in the Tittabawassee River flood plain soils. These guidance documents include:

- "Dioxin Fact Sheet"
- "Food, Farming, and Gardening Guidelines For Minimizing Dioxin Exposure"
- "Information About Dioxin and the Tittabawassee River Flood Plain"

Based on the dioxin concentrations that have been identified in the flood plain soils, and the pervasive presence of dioxin within the flood plain, the DEQ recommends that persons exposed to the Tittabawassee River flood plain soil follow the precautions identified in these guidance documents.

UPCOMING ACTIVITIES

The DEQ will be working with representatives from the DCH and the MDA to fully evaluate the results of the Phase II Environmental Assessment. As previously indicated, a final report is expected to be completed during the fall of this year.

Given the preliminary data observations, the DEQ may be collecting soil samples from additional properties located within the estimated 100-year flood plain to provide additional insight into the extent of dioxin contamination within the flood plain.

PUBLIC ACCESS

It may be necessary for the DEQ to gain access to private property to properly implement post-Phase II investigation activities. The DEQ will contact landowners beforehand to obtain permission to access the property to collect soil samples or other needed information as necessary.

GLOSSARY

Estimated 100-Year Flood Plain: the area of land located adjacent to a river that is expected to flood once every 100 years. The estimated boundaries of the 100-year flood plain are shown on the attached maps. However, higher elevations within the boundaries which may not be subjected to flooding are not identified.

Dioxin: for the purpose of this information bulletin, dioxin is a generic term for a group of chemical compounds that are waste by-products of chlorine manufacturing and incineration.

Parts Per Trillion (ppt): ppt is a term to describe the amount of a chemical contaminant in an environmental media (air, water, soil). Trillion is the number 1 followed by 12 zeros. A ppt is 1 part of the chemical contaminant in 1,000,000,000,000 parts of an environmental media.

Total Toxic Equivalent (TEQ): the dioxin results are expressed in total toxic equivalent as a measure of the total toxicity of the dioxin family of compounds present within the soil sample. To generate a TEQ value, the toxicity of any dioxin compound is defined relative to the most toxic dioxin compound, this being 2,3,7,8 tetrachlorodibenzo-p-dioxin. The TEQ value is generated by adding the equivalent toxicity values for the various dioxin compounds present in the soil sample and provides a useful method to compare the dioxin concentrations present among soil sample locations.

Residential Direct Contact Criteria (RDCC): a soil concentration that is safe for direct contact at a residential use property in Michigan; in other words, a concentration that is protective against adverse health effects due to long-term

incidental ingestion of and/or dermal (skin) exposure to contaminated soil for residential land uses.

ATSDR Screening Level: a soil concentration or level requiring a public health evaluation of site-specific factors, such as: ingestion rates, pathway analysis, soil cover, climate, other contaminants, community concerns, demographics, and background exposure.

ATSDR Action Level: a soil concentration or level requiring a higher degree of public health action, such as: surveillance, research, health studies, community education, exposure investigations or exposure mitigation.

Polychlorinated Biphenyl (PCB): a series of chemical compounds that were manufactured and used extensively for their heat tolerance. Because of their persistence, toxicity, and the resulting ecological damage, their manufacturing was discontinued in the United States during the mid-1970s.

Total Organic Carbon: the amount of biological source carbon in a soil sample, generally expressed as a percentage of the total soil sample.

FOR MORE INFORMATION

Environmental sampling/analysis issues:
Department of Environmental Quality (DEQ)
Sue Kaelber-Matlock, Project Manager
Saginaw-Bay District Office
503 N. Euclid Ave., Suite 9, Bay City, MI 48706
989-686-8025/ext. 8303; matlocks@michigan.gov

Public health and ATSDR issues:
Department of Community Health (DCH)
Dr. Linda Larsen, Toxicologist
Environmental & Occupational Epidemiology
P.O. Box 30195, Lansing, MI 48909
(3423 N. Martin Luther King Jr. Blvd., Lansing, MI 48906)
1-800-648-6942; larsenlin@michigan.gov

Residential/commercial agriculture/gardening issues:
Department of Agriculture (MDA)
Dr. Brian Hughes, Toxicologist
Pesticide & Plant Pest Management
P.O. Box 30017, Lansing, MI 48909
(525 W. Allegan, Lansing, MI 48933)
517-241-3267; hughesb9@michigan.gov

DEQ Dioxin Web Site:
From the DEQ web site: www.michigan.gov/deq, click on the **Dioxin Information button** in the left navigational bar for health advisory and general dioxin information. For more specific information, click on "Tittabawassee River Flood Plain Contamination" under "Quick Links" from the right navigational bar of the Dioxin Web Site. You'll find color maps of sampling locations, fact sheets, bulletins, brochures, and past soil and sediment sampling reports specific to the Tittabawassee River Flood Plain environmental assessment initiative.